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□本案無體明確

五、

[54]名 稱：可防病毒及與硬體不相關地閃沖改寫系統基本輸出入系統之方法

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[57]申請專利範圍：

1.一種電腦系統，其包含：
一組硬碟驅動器，用以接收以及儲存BIOS影像；
一組快閃ROM BIOS部份，用於以該BIOS影像被閃沖改寫；
一組RAM記憶體，用以當該BIOS影像是將被閃沖改寫進入該快閃ROM BIOS部份時從該硬碟接收以及儲存該BIOS影像；以及
一組軟體SMI處理器程式，用以在允許該BIOS影像被閃沖改寫進入該快閃ROM BIOS部份之前決定該BIOS影像是否為特定電腦系統的被認可BIOS影像。

2.如申請專利範圍第1項之電腦系統，其中該軟體SMI處理器程式進一步地包含電腦使用者大致無法存取之一組指令碼。

3.如申請專利範圍第1項之電腦系統，其中該軟體SMI處理器僅可經由一組軟體SMI中斷被存取。

4.如申請專利範圍第1項之電腦系統，其中該BIOS影像至少包含一組加密碼部份，該加密碼部份是利用該軟體SMI處理器程式解密碼。

5.如申請專利範圍第4項之電腦系統，其中該軟體SMI處理器程式使用該加密碼部份決定是否該BIOS影像為該被認可的BIOS影像。

6.如申請專利範圍第1項之電腦系統，其中該BIOS影像包含CRC以及檢查和之至少一組，該至少一組CRC以及檢查和被該軟體SMI處理器程式使用以決定該BIOS影像是否為該被認可的BIOS影像。

7.如申請專利範圍第1項之電腦系統，其中該軟體SMI理器程式是一種硬體無關程式。

8.如申請專利範圍第1項之電腦系統，其中該軟體SMI理器程式被儲存於

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記憶體之系統管理記憶體片段中。

9.如申請專利範圍第1項之電腦系統，其中該軟體SMI處理器程式以抗解組合壓縮格式存在。

10.一種用以提供被認可影像的方法，該方法包含的步驟有：
產生一組BIOS影像；以及
將該BIOS影像後處理以產生被認可的BIOS影像，該被認可的BIOS影像至少包含可被一組預定電腦模式上面所發現的程式解釋之一組預定指令碼。

11.如申請專利範圍第10項之提供被認可BIOS影像的方法。其中該預定指令碼至少包含公用鑰匙、檢查和、CRC、以及加密碼部份之一種。

12.一種用以閃沖改寫電腦系統中ROM BIOS部份之方法，該方法包含的步驟有：
決定一組快閃BIOS檔案名稱以及一組快閃BIOS檔案大小；
決定一組軟拉SMI埠中斷；
置放具有該被決定快閃BIOS檔案名稱以及該快閃BIOS檔案大小之一組BIOS影像進入RAM；
使用一組快閃BIOS簽字以指示閃沖改寫該BIOS是有意的；
產生一組軟體SMI中斷；
在該軟體SMI中斷時執行一組特定指令碼以決定該BIOS影像是否為該電腦系統之被認可的BIOS影像；並且
如果該BIOS影像被決定為該被認可的BIOS影像則閃沖改寫該ROM BIOS部份。

13.如申請專利範圍第12項之用以閃沖改寫該電腦系統中該ROM BIOS部份之方法，其中該BIOS影像具有該被決定之快閃BIOS檔案名稱並且該快閃BIOS檔案大小是被置於連續的

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RAM區塊中。

14.如申請專利範圍第12項之用以閃沖改寫該電腦系統中該ROM BIOS部份之方法，其中該執行特定指令碼的步驟包含將該BIOS影像之預定部份解密碼之步驟。

15.如申請專利範圍第12項之用以閃沖改寫該電腦系統中該ROM BIOS部份之方法，其中該執行特定指令碼的步驟包含檢查發現於該BIOS影像之預定部份中之檢查和以及CRC之至少一組的步驟。

16.一種用以重新規劃電腦系統中ROM BIOS部份之方法，該方法包含的步驟有：
決定是否便用者有意地啟動ROM BIOS部份之重新規劃；
建立可與該電腦系統匹配之被認可的ROM BIOS影像之一組ROM BIOS影像；並且
如果該ROM BIOS影像是被認可的ROM BIOS影像則重新規劃該ROM BIOS部份。

17.如申請專利範圍第16項之用以重新規劃電腦系統中ROM BIOS部份之方法，其中該決定步驟採用軟體SMI啟動之一組程式。

18.如申請專利範圍第16項之用以重新規劃電腦系統中ROM BIOS部份之方法，其中該建立步驟包含反應於軟體SMI而執行儲存於RAM之系統管理記憶體片段中軟體的步驟。

19.如申請專利範圍第16項之用以重新規劃電腦系統中ROM BIOS部份之方法，其中該建立步驟包含至少將該BIOS影像之預定部份以一組私用鑰匙解密碼的步驟。

20.如申請專利範圍第16項之用以重新規劃電腦系統中ROM BIOS部份之方法。其中該重新規劃該ROM BIOS

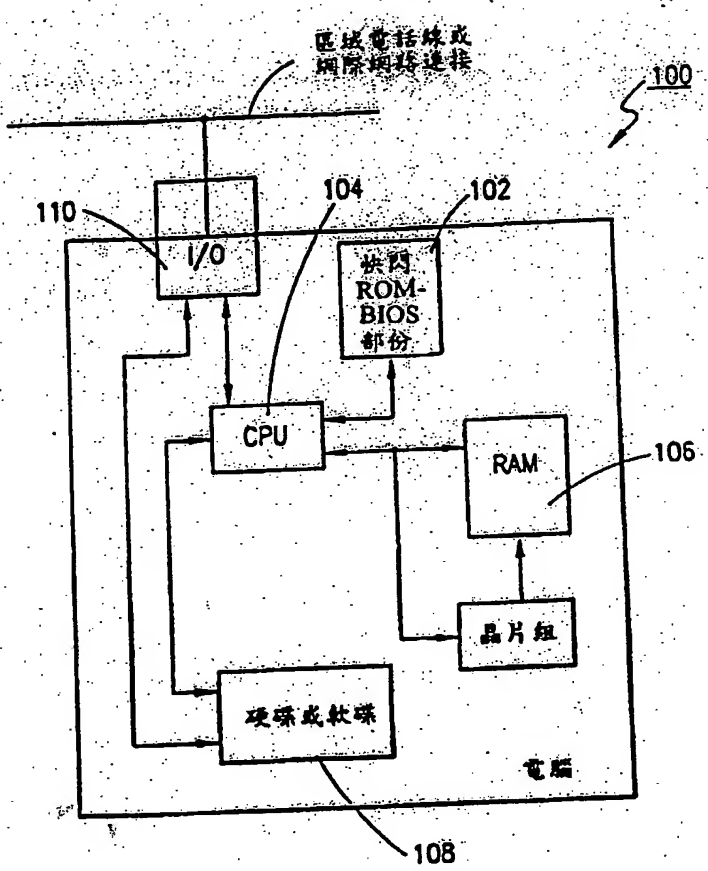
部份之步驟包含以該ROM BIOS影像閃沖改寫該ROM BIOS部份的步驟。

圖式簡單說明：

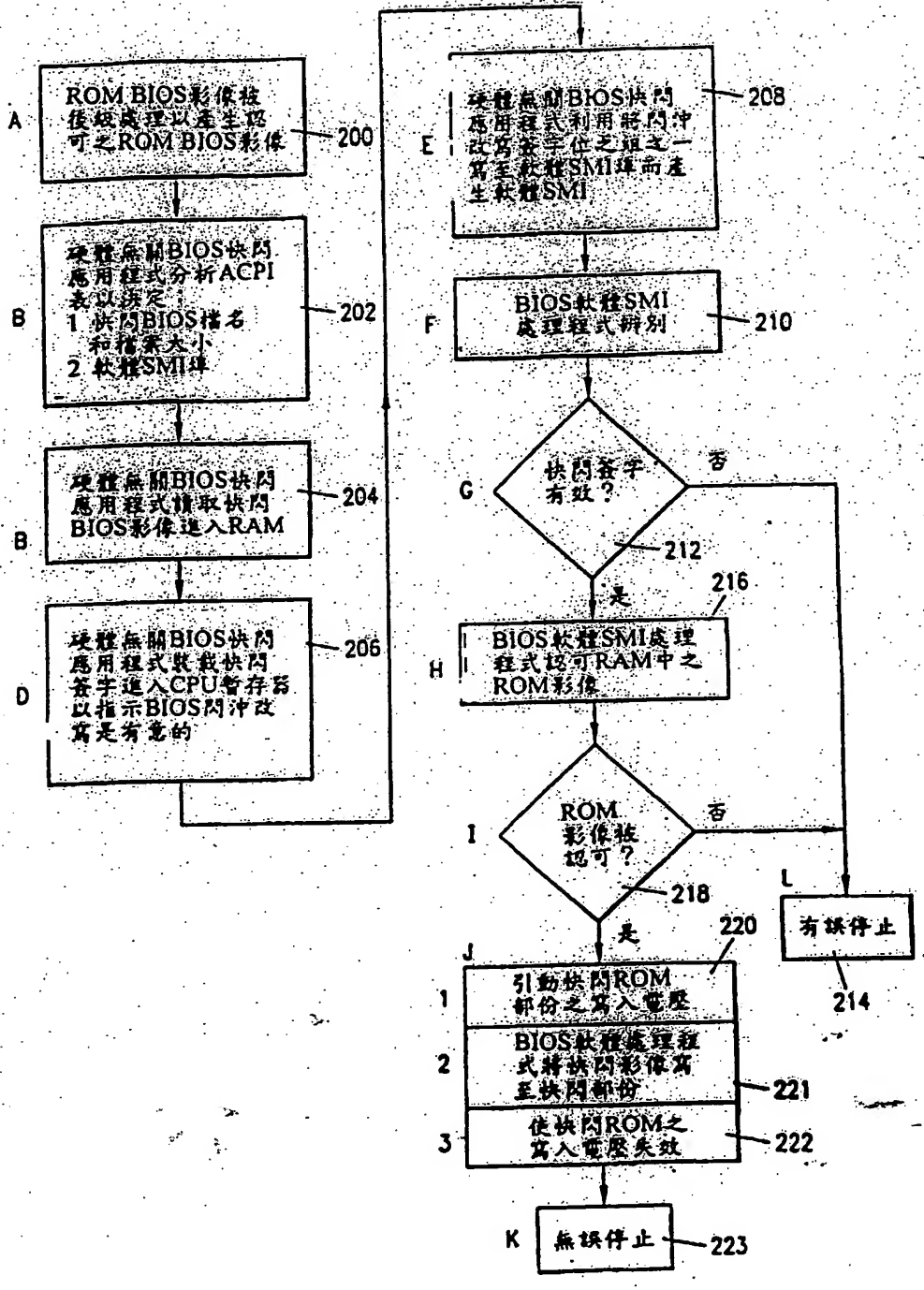
第1圖示出可採用本發明之實施例的一組範例電腦系統。

第2圖示出依據本發明用以閃沖改寫ROM BIOS的範例方法之流程圖；以及

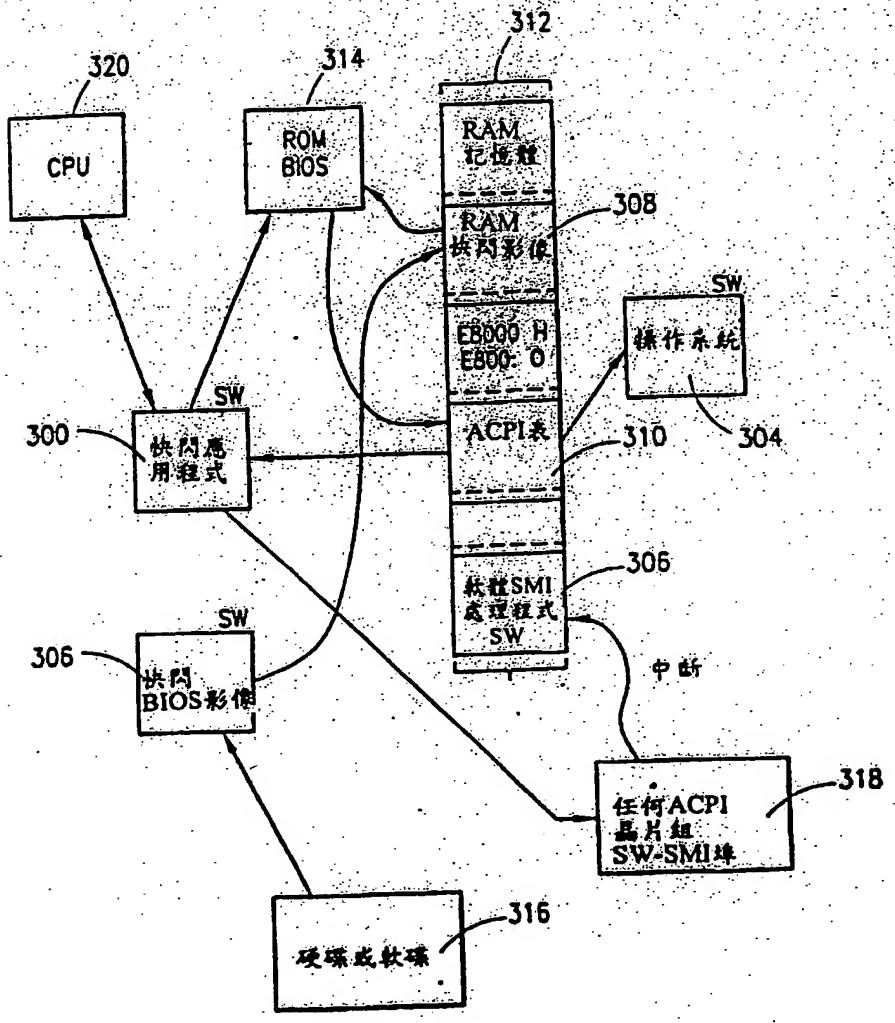
第3圖示出依據本發明的硬體和軟體之間的關係範例圖。



第1圖



第 2 圖


312
320
314
CPU
ROM BIOS
RAM 記憶體
RAM 快閃影像
308
SW
EB000 H
EB00: 0
作業系統
304
300
SW
快閃應用程式
ACPI表
310
306
軟體SMI處理程式 SW
中斷
306
SW
快閃 BIOS影像
任何ACPI 晶片組 SW-SMI埠
318
硬碟或軟碟
316

第 3 圖

正本

經濟部智慧財產局專利核駁審定書

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1 2002/12/04 南韓2002-76598

七、審查人員姓名：易序忠　委員

八、審定內容：

主文：本案應不予專利。

依據：專利法第二十條第二項。

理由：

（一）本案「電腦系統之BIOS保全方法」，係一種有關電腦系統基本輸出輸入系統（BIOS）保全的方法。包括：儲存一檢查總和值，其係由加總一使用者密碼位元組和一基本輸出入系統唯讀記憶體的一產品序號位元組計算而得；比較儲存檢查總和值與藉由加總輸入的密碼位元組和該BIOS ROM的產品序號位元組計算而得的一檢查總和值；以及當該儲存檢查總和值與該計算檢查總和值相同時，開啟寫入至該BIOS ROM。

（二）本案關鍵技術乃是藉由加總檢查功能來檢查由製造商給予之產品序號以及使用者給予之控制密碼，BIOS ROM能有效的避免隨意的或惡意的竄改、改變或移除的動作。經查本案申請日前相關國內外資料，我國專利公報分別於2002年3月21日、2000年8月11日公告第480443號（引證如附件一）、第401562號（引證如附件二），已揭露此相關技術。本案係轉用於類似或相近之技術領域中進行，而未產生突出的技術特徵或顯然的進步，所以

此種轉用視為熟習該項技術者所能輕易完成，而未能產生突出的技術特徵或顯然的進步；而本案和引證案構成要件置換、排列變更及組合亦未能產生突出的技術特徵或顯然的進步。所以本案乃運用申請前既有之技術或知識，而為熟悉該項技術者所能輕易完成，故不具進步性。

據上論結，本案不符法定專利要件，爰依專利法第二十條第二項，審定如主文。

局長 蔡練生

依照分層負責規定授權單位主管決行

如不服本審定，得於文到之次日起三十日內，備具再審查理由書一式二份及規費新台幣陸仟元整（專利說明書及圖式合計在五十頁以上者，每五十頁加收新台幣五百元，其不足五十頁者以五十頁計），向本局申請再審查。

VIRUS RESISTANT AND HARDWARE INDEPENDENT METHOD OF FLASHING SYSTEM BIOS

Field of the Invention

The present invention relates generally to the BIOS of a general purpose computer and more particularly to techniques for allowing the BIOS to be reprogrammed that are resistant to inadvertent or unauthorized reprogramming of the BIOS.

Description of Related Art

The BIOS (Basic In/Out System) is generally a piece of software or code stored in a specific memory area of a computer. The computer uses the BIOS to get itself started properly when turned on. The BIOS may be used,

from time to time, thereafter to help manage data transactions between hardware and programs.

Many electronic devices that do not operate like standard personal computers have begun to incorporate BIOS into their circuitry. For example, a modem may include an 80C186 microprocessor which utilizes a BIOS. Furthermore, CD and tape writers, laser and ink jet printers which contain microcontroller or microprocessor based computing circuitry have begun to incorporate a BIOS of some kind for use at start up to get the device operating and running when turned on.

Some PC (personal computer) operating systems (*e.g.*, Linux, NT) have dispensed with the services of the BIOS while the system is running, but they all require and rely on the BIOS when the PC is started or turned on. A PC chipset (the majority of interconnect and control circuitry of a PC found within a few chips on a PC motherboard) has many configurable options, such as memory and bus timing, port configuration and so on, which are configured by the BIOS at start up. However, an inoperable computer results if the options are not configured correctly by the BIOS at start up.

At one time the BIOS were programmed into ROM chips on the PC mother board. The BIOS ROM chips could not be reprogrammed, but instead had to be replaced with a newly programmed BIOS ROM chip.

As ROM chips became programmable, EEPROM's, and Flash ROMS began to be used for BIOS chips. In particular, Flash ROMs can be programmed without being removed from a circuit board. This is useful in the personal computer industry because a Flash ROM BIOS chip ("Flash BIOS") can be reprogrammed ("flashed") and upgraded with new data without opening the chassis of the personal computer.

At present, there are various computer systems that allow the BIOS code to be flashed. Before a presently existing computer system flashes the system BIOS, the flash (reprogramming) application generally verifies that the BIOS image to be programed/flashed into the Flash BIOS is a correct size or has a correct file name for the computer, but in present systems it is not possible to actively check the BIOS image to make sure it will be compatible with the computer it will be loaded into. Furthermore, at present it is not possible to program a

Flash ROM BIOS in a "protected programming" mode of the computer's operating system such as while operating in Windows '95 or '98. Thus, ROM BIOS flashing must be performed in a "real" mode operating system such as MS-DOS. A drawback of this technique of flashing the BIOS is that the verification code required for flashing the ROM BIOS exists as an executable file that may be found and disassembled by a hacker. The hacker could easily discern sufficient information from the disassembled code to create a flash ROM BIOS image that will be accepted as a BIOS image and render the computer unusable.

There are some other serious problems associated with the ability of a computer user to Flash his own computer's BIOS. For example, suppose a user wanted to upgrade the information in his Flash BIOS. He would have to obtain a new BIOS program from the computer manufacturer, the worldwide web, or another source. Then to perform the Flash BIOS upgrade, the user would initiate a "burner" program on his PC. That is, the burner program will use circuitry built into the PC's mother board (provided it supports flash upgrading) and erase the existing data/information in the Flash BIOS

chip and then program or load the new BIOS data/information into the chip. This is all fine and good unless an inappropriate BIOS program obtained and then loaded into the Flash BIOS is used. If an inappropriate BIOS program was loaded into the BIOS chip, the user's computer would be rendered inoperable.

Another problem, as discussed above, is that a hacker could write a computer virus that could initiate the burner software and Flash the BIOS of an unsuspecting user's computer thereby rendering the computer inoperable.

Thus, there is a need for a computer system that resists having its BIOS flashed so that an incompatible BIOS program, other data, or no data is left in the memory area where the BIOS program is kept. Furthermore, there is a need for a computer system that has a virus resistant and hardware independent method for flashing the BIOS so that only a system compatible BIOS code can be flashed into the Flash BIOS chip.

Summary of the Invention.

In one embodiment of the present invention a computer system comprises a hard disk drive where a BIOS

image can be stored on a magnetic media. If a user wants to reprogram a ROM BIOS part with the BIOS image, a utility program is executed. The utility program generates a software system management interrupt in order to trigger a handler program. The handler program is stored in the system management memory portion of RAM which is inaccessible to a user. The handler program checks the BIOS image for a specific code to determine whether the BIOS image is a certified BIOS image that is certified for the operating computer system. If the handler program determines that the BIOS image is certified, then it will reprogram the ROM BIOS part with the certified BIOS image.

Brief Description of the Drawings.

Various objects and advantages of this invention will become apparent and more readily appreciated from the following description of the presently preferred exemplary embodiments, taken in conjunction with the accompanying drawings of, of which:

FIGURE 1 depicts an exemplary computer system that may incorporate an exemplary embodiment of the present invention.

FIGURE 2 depicts a flow chart of an exemplary method for flashing ROM BIOS in accordance with the present invention; and

INVENTION 3 depicts an exemplary diagram of hardware and software relationships in accordance with the present invention.

Detailed Description of the Presently Preferred Exemplary Embodiments.

Exemplary embodiments of the present invention will now be described. The invention may be embodied in many different forms and should not be construed as limited to the embodiments set forth herein; rather, these embodiments are provided so that this disclosure will be thorough and complete, and will fully convey important aspects of the present invention to those skilled in the art.

Referring first to FIGURE 1, selected portions of a general computer or personal computer (PC) 100 are shown that incorporates an exemplary embodiment of the present invention. Upon start up of the PC 100, the BIOS program, stored in a Flash ROM BIOS memory 102, is interpreted by the central processing unit ("CPU") 104. The BIOS is a piece of code that the PC 100 uses to get itself started when the computer is switched on. In some cases, the BIOS is further utilized to manage data transactions between hardware and programs. Hardware that is "set up" by the BIOS may include RAM memory 106, hard or floppy disk drives 108, input/output circuitry 110, and modem circuitry 112.

There may be times that a user wants to upgrade or reprogram the flash BIOS 102. Furthermore, a malicious hacker may attempt to write a 'virus' program that is directed to flashing the Flash BIOS 102 with a new invalid or corrupted BIOS program or BIOS image. In either case, an exemplary embodiment of the present invention will help prevent the user or the virus program from flashing a system BIOS with a 'non-certified' or non-compatible BIOS image. By preventing the BIOS from being flashed with an invalid, uncertified or incompatible BIOS program, computer repair costs are avoided and the computer 100 operates as a more reliable system to the user.

In one embodiment of the present invention, all the hardware dependent code that is utilized to flash the ROM BIOS is kept in an inaccessible SMM (system management memory) segment. Additionally, prior to copying the hardware dependent code to a SMM segment of memory, the code only exists in a disassembly resistant compressed format. Furthermore, an exemplary computer system will flash the BIOS only during an SMI (system management interrupt) mode, thus, it is possible to reprogram or

flash the ROM Bios when the computer system is operating in a real mode (*e.g.*, a MS-DOS mode), a virtual Intel 8086 mode or a protected mode (*e.g.*, MS-DOS with a virtual memory manager such as EMM 386.exe, while operating in Windows '95, '98, NT).

Preferably, the present invention makes it extremely difficult for a hacker or user to determine how to update or flash the current flash ROM BIOS because the necessary code required to flash the BIOS runs only during a System Management Interrupt ('SMI') mode. There is essentially extremely limited mechanisms to enable a hacker or user to step through the code operating during a SMI mode to figure out what the code does to flash the ROM BIOS. The code is operated in a portion of the computer memory that is hidden to other programs; the code that flashes the BIOS is only 'visible' to the BIOS when the computer is processing an SMI.

Furthermore, the firmware within the computer circuitry that is used to flash the Bios requires the BIOS image (the new BIOS data that a user wants to have flashed into the existing Flash ROM BIOS part) to have a means for verifying that the BIOS image is compatible

with the computer it is about to be placed into. The means for verification could be a checksum added to the end, middle or other location in the BIOS image. The means for verification could be that the BIOS image comes in an encrypted format that is understood by the specific model of computers for which it can be installed in. The intent of the means for verifications is so that the computer will not allow its BIOS to be flashed unless the BIOS image can be verified or certified as a valid, certified or authentic BIOS image for the particular computer model.

Referring again to FIGURE 1, a BIOS image that may be later flashed into the ROM BIOS 102 can be provided and stored in a computer 100 a variety of ways. The image can be provided via a floppy drive, hard drive, zip drive 108 or other data storage medium. Furthermore, the BIOS image could be downloaded from a global network (such as the Internet), retrieved from a LAN or WAN, or provided via a phone line modem or other external data connection via an I/O Port 110.

FIGURE 2 depicts a flow chart describing both an exemplary process of creating a certified ROM BIOS image

and exemplary steps for updating or flashing the ROM BIOS part. An exemplary process for creating a certified BIOS image begins at step 200 wherein a ROM BIOS image is processed to create a certified ROM BIOS image. There are a variety of ways to process a BIOS image to certify it. Three exemplary techniques for certifying a ROM BIOS image are presented, but one of ordinary skill in the art could discern other certification techniques. One technique for creating a certified BIOS image is to encrypt the entire BIOS image using a private key known only to the SMI handler software. The ROM image, can be decrypted with the private key and then it can be established that the decrypted image is a certified image before being flashed into the ROM BIOS. If the ROM image cannot be decrypted with the private key, then it is certainly not certified. Each model of computer would contain a different private key, thus encrypted BIOS images could only be used in computer models having the correct private key in the SMI handler to decrypt the BIOS image.

A second technique for creating a certified BIOS image is to have a hidden check sum or cyclical

redundancy check ('CRC') embedded into the BIOS image at an offset or predetermined code location that is only known by the SMI handler. The offset could be stored in the SMI handler during a manufacturing process. It is not important what the offset or location is except that the SMI handler code knows where to look in a BIOS image for the certification information.

A third technique for creating a certified ROM BIOS image that a user may want to flash into his computer's flash ROM BIOS part 102 is to attach or append an encrypted checksum or cyclic redundancy check ('CRC') to the end of the BIOS image using a private key. The private key would be known only to the SMI handler software of similar computer models. The SMI handler would aid in decrypting the checksum or CRC to determine if the BIOS image is a certified image and appropriate to be loaded into the ROM BIOS part of the computer. Once a certified BIOS image is established for the particular computer model, then the certified BIOS image can be provided by the manufacturer of the computer to users for their computers. The user's computer, upon receipt of the BIOS images, will have the means to determine whether

a received BIOS image is certified or valid as an appropriate BIOS for the particular computer. Beginning at step 202, an exemplary technique for determining whether the BIOS image is an appropriate certified BIOS image and the steps of flashing the certified BIOS image into the ROM BIOS part is disclosed.

In some cases a manufacturer will provide a software file or files with a plurality of BIOS images. Each BIOS image being intended for a different computer model. In steps 202 and 204 the computer's firmware or preloaded computer software must determine which one of a plurality of BIOS images is the appropriate BIOS image for being loaded into the RAM BIOS part of the particular computer.

At step 202 a hardware independent BIOS ~~flash~~ utility gathers information from an ACPI table found in an ACPI supporting BIOS, but created by the resident BIOS code at start up. In the preferred embodiment the filename, the file size and the software SMI port location is gathered from the ACPI table. The file name is preferably the name of the file where the BIOS image for the particular computer is found. The file size information is the size of the BIOS image file. The

software SMI port is the I/O port location that generates a software SMI when written to.

In particular, an exemplary hardware independent flash utility searches the RAM memory addresses OEOOOOH through OFFFFFH for the ACPI table signature "RSD PTR." If the signature is not found, the utility displays an error message and terminates. If the signature is found, the application reads the following items from the ACPI table: the OEM Table ID in the Root System Description table (RSD) which is a field that contains the file information to derive the flash BIOS file name; 2) and the SMI port address in the Fixed ACPI Description Table. The SMI port address is the address of the SMI port that provides the SMI interrupt.

At step 204 the hardware independent BIOS flash utility reads the BIOS image found in the file name, specified in step 202, into preferably a contiguous block or continuous block of RAM memory. The CPU registers are set to indicate the location and size of the stored BIOS image.

At step 206, the hardware independent BIOS flash utility passes a flash signature or other data

information into one or more CPU registers to indicate that a flash update is indeed requested, desired and intentional.

At step 208, the BIOS flash utility generates a software SMI by writing a code to the software SMI I/O port. The code could be all or a portion of the flash signature that was passed into one or more of the CPU registers in step 206. The result is that an SMI occurs. Flashing of the ROM BIOS can only occur in an exemplary embodiment during a software SMI event.

In step 210, the Software SMI handler begins operating and validates the flash signature. Again, the flash signature indicates that a flash update is requested, desired and intentional. If the software SMI handler determines that the flash signature is not valid, then the flash BIOS process is stopped and an error is displayed to the user at steps 212 and 214.

If the flash signature is valid at step 212, then the SMI handler proceeds to step 216 where the SMI handler utilizes a private key or other information only known to the SMI handler (as discussed in step 200) to determine whether the BIOS image is a certified BIOS

image. A certified BIOS image is a BIOS image that is correct for the current computer system. By requiring the SMI handler to have a private key or other information to decrypt a portion of or otherwise determine that the BIOS image is a certified BIOS image, hackers and inexperienced computer users are thwarted from flashing a ROM BIOS part with an inappropriate BIOS image.

If the BIOS image in RAM is not certifiable by the software SMI handler, then the flashing processes is stopped and an error message is displayed in steps 218 and 214.

If the BIOS image, stored in RAM, is certifiable by the Software SMI handler in steps 216 through 218, then a write enable signal is provided to the ROM part in step 200. The write enable signal may be a general purpose I/O that has to be turned on or off. The general purpose I/O location would also have to be known only to the SMI handler code and should not be known or accessible in any other place in the computer so that it would be extremely difficult for a hacker to learn how to enable a signal to the ROM BIOS part and have them flashed.

In step 221, the BIOS SMI handler writes the BIOS image to the ROM BIOS part (*i.e.*, flashes the ROM BIOS part). The write enable signal is disabled or made inactive in step 222. At this point the BIOS image has been loaded into the ROM BIOS part in the place of the preexisting ROM BIOS code. In step 223, the process of flashing the BIOS ends without an error

Referring now to FIGURE 3, a general flow of data or information between various subsystems and software/firmware on and off a computer motherboard is shown for implementing an exemplary virus resistant ROM BIOS flashing method and invention.

It is noted that the flash utility 300, the flash image 310, the operating system 304, the software handler 306, the RAM flash image 308, and the ACPI table 310 are all software, firmware or data code.

In an exemplary embodiment, a user or virus program will request that the flash utility 300 be executed in order to have a new BIOS image 302 flashed into the present ROM BIOS part 314. The BIOS image 302 ~~may have~~ been stored in a storage media such as a harddisk or floppy drive 316. The flash utility 300 retrieves a

needed BIOS file name and file size information from an ACPI table 310 stored in RAM Memory 312. The correct BIOS image 302 can then be retrieved from the storage media 316 and placed in a continuous block of RAM 308. The flash utility will then instruct an ACPI chipset 318 to provoke a software SMI interrupt, but only after the CPU provides a flash signature indicating that the request for flashing the BIOS is intentional. The software, SMI handler then determines whether the flash image stored in RAM 308 is a certified BIOS image. The certification is established via a secret encryption key or other secret data only known by the SMI software handler which is used to check the BIOS image for authenticity and certification.

Since the SMI handler only operates when a software SMI interrupt is applied; and since the SMI handler is stored in a user inaccessible part of RAM, it is extremely difficult for a hacker to determine the secret code or information required or used to certify a BIOS image. Thus, if the software SMI handler does not certify the BIOS image, then the ROM BIOS part cannot be flashed.

The exemplary embodiments thus establish a virus resistant method for flashing ROM BIOS. The embodiments have a need for a certified BIOS image that would be extremely hard for a hacker to create since the information is hidden in the software SMI handler. The software SMI handler code is substantially inaccessible to a user or hacker because it is located in a portion of memory which is a system management memory segment (SMM segment) and, in addition, only exists in a dissembly resistant compressed format when not being used.

Although various preferred embodiments of the invention and method have been shown and described, it will be appreciated by those skilled in the art that changes, both insignificant and significant, can be made to these embodiments without departing from the principles and the spirit of the invention, the scope of which is defined in the appended claims.

WHAT IS CLAIMED IS:

1. A computer system comprising:

a hard disk drive for receiving and storing a BIOS image;

a Flash ROM BIOS part adapted to be flashed with said BIOS image;

a RAM memory for receiving and storing said BIOS image from said hard disk when said BIOS image is to be flashed into said Flash ROM BIOS part; and

a software SMI handler program for determining whether said BIOS image is a certified BIOS image for a particular computer system prior to allowing said BIOS image to be flashed into said Flash ROM BIOS part.

2. The computer system of claim 1, wherein said software SMI handler program further includes a code that is substantially inaccessible to a computer user.

3. The computer system of claim 1, wherein said software SMI handler can only be accessed via a software SMI interrupt.

4. The computer system of claim 1, wherein said BIOS image comprises at least an encrypted portion, said encrypted portion being decrypted by said software SMI handler program.

5. The computer system of claim 4, wherein said software SMI handler program uses said encrypted portion to determine whether said BIOS image is said certified BIOS image.

6. The computer system of claim 1, wherein said BIOS image comprises at least one of a CRC and a check sum, said at least one of a CRC and a check sum being used by said software SMI handler program to determine whether said BIOS image is said certified BIOS image.

7. The computer system of claim 1, wherein said software SMI handler program is a hardware independent program.

8. The computer system of claim 1, wherein said software SMI handler program is stored in a system management memory segment of memory.

9. The computer system of claim 1, wherein said software SMI handler program exists in a disassembly resistant compressed format.

10. A method for providing a certified image, said method including the steps of:

creating a BIOS image; and

postprocessing said BIOS image to create a certified BIOS image, said certified BIOS image comprising at least a predetermined code that can be interpreted by a program found on a predetermined computer model.

11. The method for providing a certified BIOS image of claim 10, wherein said predetermined code comprises at least one of a public key, a checksum, a CRC, and an encrypted portion.

12. A method for flashing a ROM BIOS part in a computer system, said method comprising the steps of:

determining a Flash BIOS file name and a Flash BIOS file size;

determining a software SMI port interrupt;

placing a BIOS image having said determined Flash BIOS file name and said Flash BIOS file size into RAM;

using a flash BIOS signature to indicate that flashing said BIOS is intentional;

generating a software SMI interrupt;

executing a specific code during said software SMI interrupt to determine whether said BIOS image is a certified BIOS image for said computer system; and

flashing said ROM BIOS part if said BIOS image is determined to be said certified BIOS image.

13. The method for flashing said ROM BIOS part in said computer system of claim 12, wherein said BIOS image having said determined Flash BIOS file name and said Flash BIOS file size is placed in a continuous block of RAM.

14. The method for flashing said ROM BIOS part in said computer system of claim 12, wherein said step of executing a specific code includes a step of decrypting a predetermined portion of said BIOS image.

15. The method for flashing said ROM BIOS part in said computer system of claim 12, wherein said step of executing a specific code includes a step of checking at least one of a check sum and a CRC found in a predetermined portion of said BIOS image.

16. A method for reprogramming a ROM BIOS part in a computer system, said method comprising the steps of:

determining whether a user intentionally initiated a ROM BIOS part reprogramming;

establishing that a ROM BIOS image is a certified ROM BIOS image that is compatible with said computer system; and

reprogramming said ROM BIOS part if said ROM BIOS image is a certified ROM BIOS image.

17. The method for reprogramming said ROM BIOS part in a computer system of claim 16, wherein said step of determining utilizes a program initiated by a software SMI.

18. The method for reprogramming said ROM BIOS part in a computer system of claim 16, wherein said step of establishing comprises a step of running software stored in a system management memory segment of a RAM in response to a software SMI.

19. The method for reprogramming said ROM BIOS part in a computer system of claim 16, wherein said ~~step~~ of establishing comprises a step of decrypting at ~~least~~ a predetermined portion of said BIOS image with a private key.

20. The method for reprogramming said ROM BIOS part in a computer system of claim 16, wherein said step of reprogramming said ROM BIOS part includes a ~~step~~ of flashing said ROM BIOS part with said ROM BIOS image.

ABSTRACT OF THE DISCLOSURE

A system and method for making sure that before the ROM BIOS of a personal computer is reprogrammed, the BIOS image is compatible with the computer whose BIOS are being reprogrammed. This is done by requiring the utility that performs the reprogramming of the ROM BIOS to have a secure portion of code that is stored in a portion of the computer's memory that is inaccessible to a user. The secure portion of code is used to make sure that the BIOS image to be programmed into the computer is compatible with the computer.

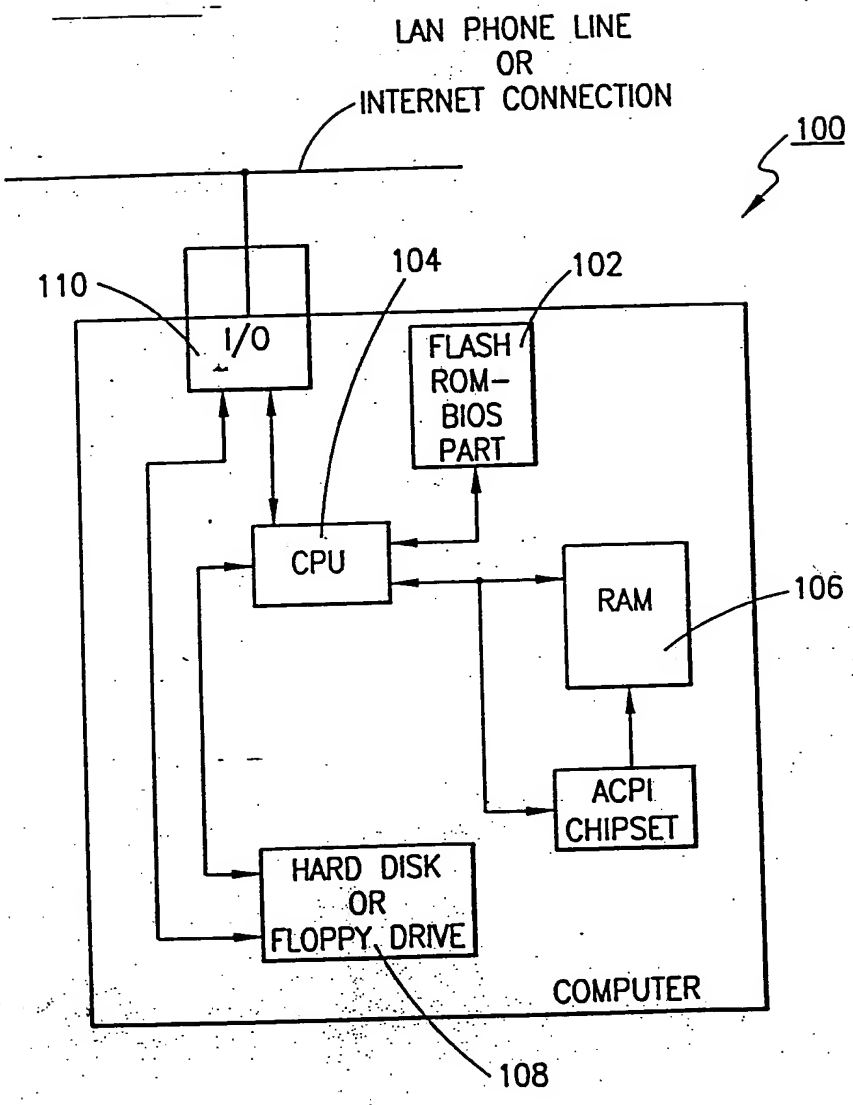
LAN PHONE LINE
OR
INTERNET CONNECTION
100
110
I/O
104
102
FLASH ROM-BIOS PART
CPU
RAM
106
ACPI CHIPSET
HARD DISK OR FLOPPY DRIVE
COMPUTER
108

FIG. 1

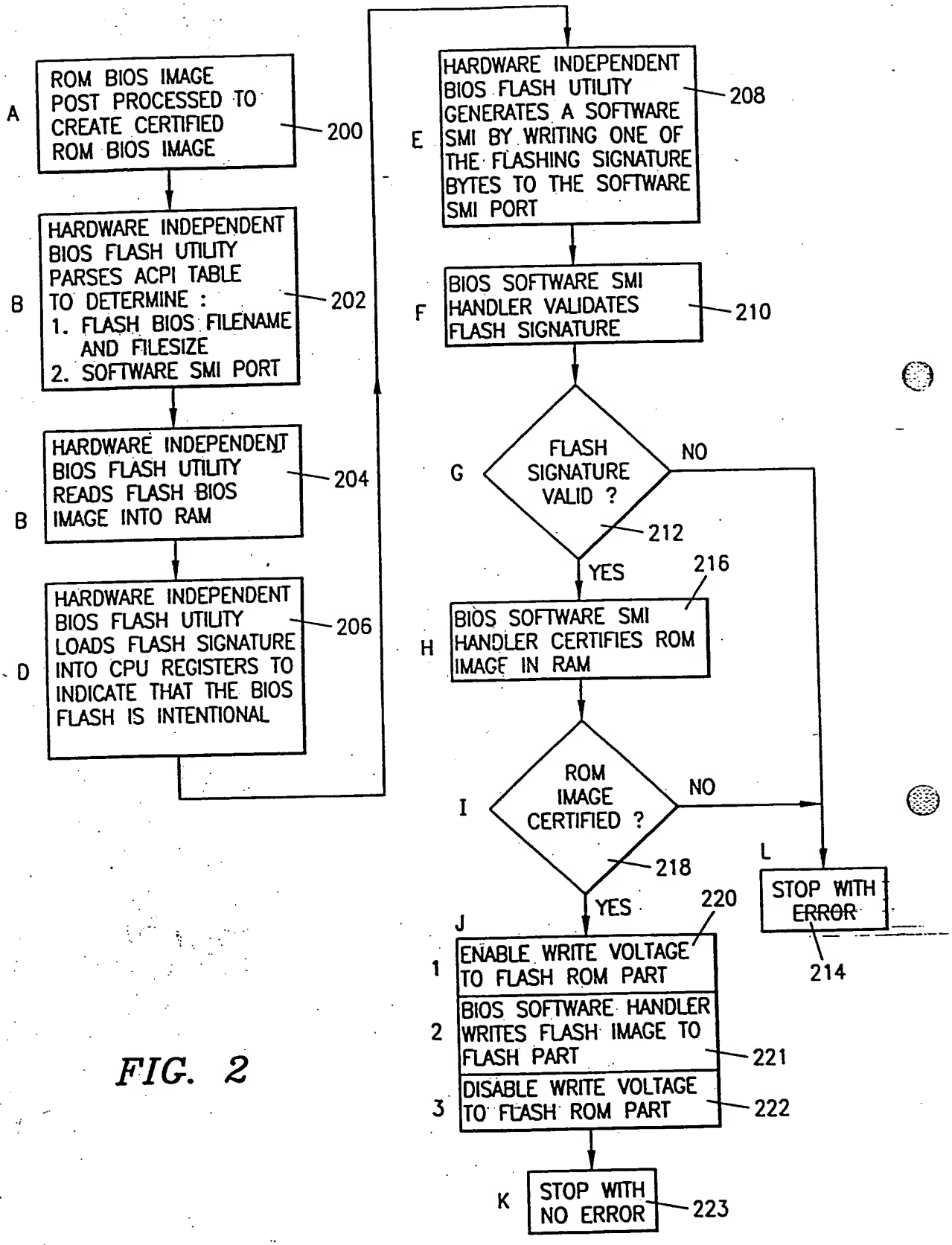
A
ROM BIOS IMAGE POST PROCESSED TO CREATE CERTIFIED ROM BIOS IMAGE
200
B
HARDWARE INDEPENDENT BIOS FLASH UTILITY PARSES ACPI TABLE TO DETERMINE :
1. FLASH BIOS FILENAME AND FILESIZE
2. SOFTWARE SMI PORT
202
B
HARDWARE INDEPENDENT BIOS FLASH UTILITY READS FLASH BIOS IMAGE INTO RAM
204
D
HARDWARE INDEPENDENT BIOS FLASH UTILITY LOADS FLASH SIGNATURE INTO CPU REGISTERS TO INDICATE THAT THE BIOS FLASH IS INTENTIONAL
206
E
HARDWARE INDEPENDENT BIOS FLASH UTILITY GENERATES A SOFTWARE SMI BY WRITING ONE OF THE FLASHING SIGNATURE BYTES TO THE SOFTWARE SMI PORT
208
F
BIOS SOFTWARE SMI HANDLER VALIDATES FLASH SIGNATURE
210
G
FLASH SIGNATURE VALID ?
212
NO
YES
216
H
BIOS SOFTWARE SMI HANDLER CERTIFIES ROM IMAGE IN RAM
I
ROM IMAGE CERTIFIED ?
218
NO
YES
L
STOP WITH ERROR
214
220
J
1
ENABLE WRITE VOLTAGE TO FLASH ROM PART
2
BIOS SOFTWARE HANDLER WRITES FLASH IMAGE TO FLASH PART
221
3
DISABLE WRITE VOLTAGE TO FLASH ROM PART
222
K
STOP WITH NO ERROR
223

FIG. 2

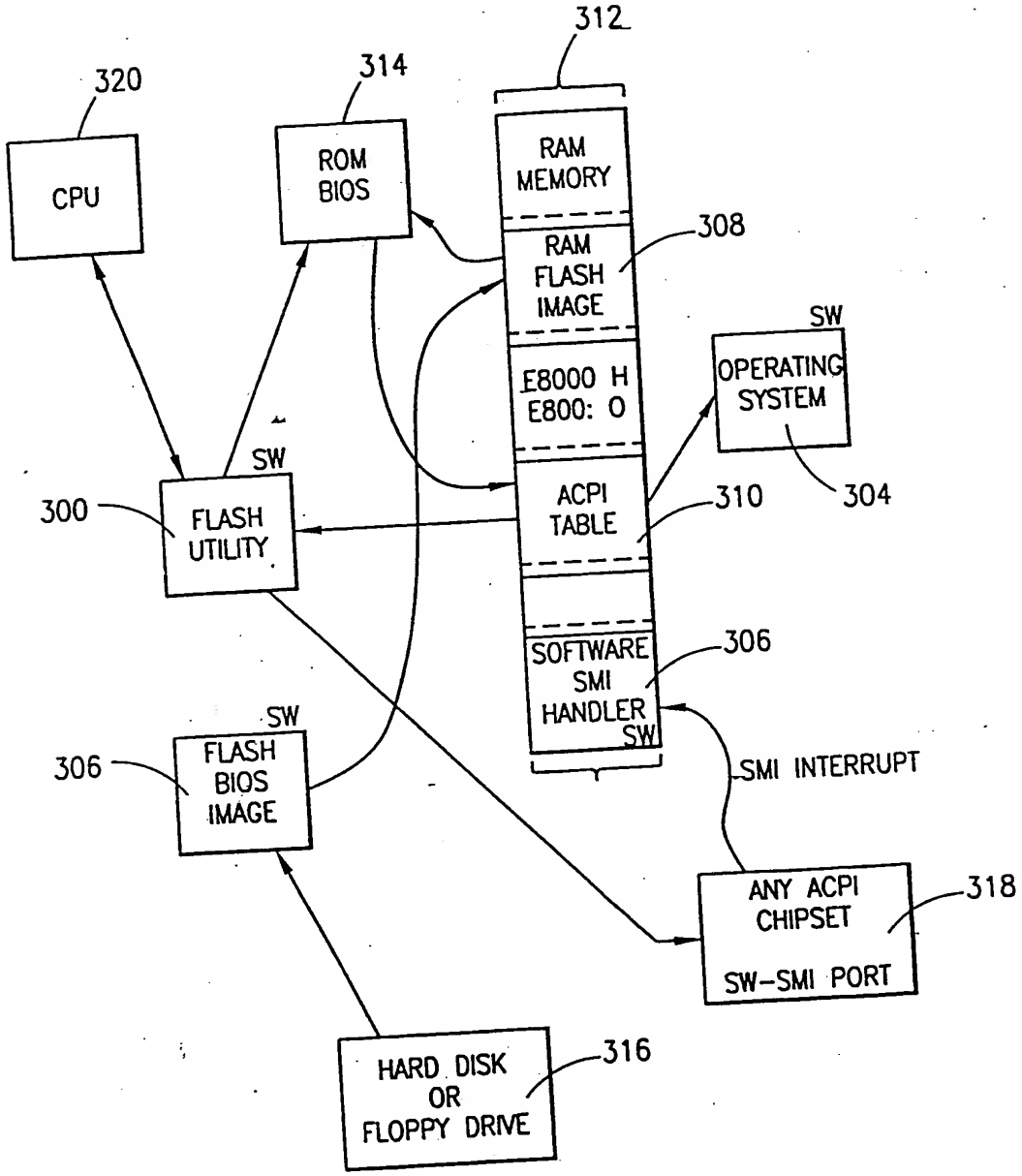
312
320
314
CPU
ROM BIOS
RAM MEMORY
RAM FLASH IMAGE
308
SW
OPERATING SYSTEM
E8000 H E800: 0
SW
300
FLASH UTILITY
ACPI TABLE
310
304
SOFTWARE SMI HANDLER
SW
306
SW
306
FLASH BIOS IMAGE
SMI INTERRUPT
ANY ACPI CHIPSET
SW-SMI PORT
318
HARD DISK OR FLOPPY DRIVE
316

FIG. 3